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<b>TRANSMITTAL FORM</b>  (to be used for all correspondence after initial filing)	Application Number	09/753,381
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	First Named Inventor	Van Beek
	Art Unit	1681
	Examiner Name	Irene Marx
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of	)	
	)	Group Art Unit 1681
Van Beek	)	
	)	
Serial No. 09/753,381	)	Examiner: Irene Marx
Filed: January 2, 2001	)	Appeal No.:
For: Method for Improving the Activity	)	
Of Enzymes	)	

**APPEAL BRIEF**

This is an appeal from the final rejection of the Examiner dated August 6, 2004 rejecting claims 1-7 and 10-13, all of the claims pending in the case. This Brief is accompanied by the requisite fee set forth in Rule 1.17(f).

**Real Party in Interest**

Kemin Industries, Inc. is the assignee of patent application number 09/753,381.

**Related Appeals and Interferences**

There are no other appeals or interferences known to Appellant, the Appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**Status of Claims**

The application was filed January 1, 2001. Claims 1-7 and 10-13 are pending in this application. Claims 8-9 have been withdrawn. Appellant is appealing the rejections of claims 1-7 and 10-13.

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### **Status of Amendments**

There have been no amendments filed subsequent to final rejection.

### **Summary of Invention**

This invention is for a method for improving the performance of enzymes used in animal feeds by the use of surfactants. Lysolecithins are added to an animal feed including an exogenous enzyme to boost the performance of the enzyme so that a desired level of performance can be maintained while reducing the amount of exogenous enzyme that must be included in the animal feed. Preferably, the surfactant includes lyso-forms of lecithin.

### **Issues**

1. Whether "lecithins that have been enzymatically enriched in the amounts of lysophospholipids to contain at least 5% by weight of lysophospholipids to the amount of lysophospholipids plus phospholipids" has sufficient support in the specification, or if the Examiner's 35 U.S.C., first paragraph rejection was appropriate.
2. Whether the term "lysolecithins," as originally appearing in the claims is supported by the specification (in the event that the Board affirms the Examiner's above-described Section 112 rejection).
3. Whether claimed invention is made obvious by Bedford *et al.* taken with Garnett *et al.* and Baisted.

### **Grouping of Claims**

As to the rejection applied against claims 1-7 and 10-13, it is applicant's intention that the rejected claims stand or fall together.

### Argument

1. Rejection of Claims 1-13 based on 35 U.S.C. 112, first paragraph

The Examiner has rejected claims 1-13 under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, the Examiner can find no basis or support for the recitation of "lecithins that have been enzymatically enriched in the amounts of lysophospholipids to contain at least 5% by weight of lysophospholipids to the amount of lysophospholipids plus phospholipids."

Appellant added this language in response to the Examiner's request for additional information regarding the term "lysolecithins" in a telephonic interview on June 18, 2004. Appellant intended the "lecithins that have been enzymatically enriched. . ." language to clarify the meaning of "lysolecithins." In other words, the new language defines the term "lysolecithins." Appellant believes that there is support in the specification for the new recitation. Specifically, support can be found in the specification in the paragraph bridging pages 4 and 5, where Lysoprin and Bolec MT are recited to be crude lecithin which has been enzymatically enriched in lysophospholipids (lysophosphatidylcholine in the case of Lysoprin and lysophosphatidic acid, lysophosphatidylethanolamine, lysophosphatidylinositol, and lysophosphatidylcholine in the case of Bolec MT) and further that they were determined to have approximately 33% lysophospholipids. In addition, footnote 3 of Table 1 recites that S2 is a surfactant containing approximately 16% Lysoprin, and footnote 3 of Table 2 recites that S3 is a

surfactant containing approximately 16% Bolec MT. Accordingly, S2 and S3 each contain approximately 33% times 16% or 5% lysophospholipids.

In addition, a description of lysolecithin (and, thus, the above recitation) as used in the specification may be made by reference to the article Sas, B., Peys, E. and Helson M. 1999 Efficient method for (lyso)phospholipid class separation by high-performance liquid chromatography using an evaporative light-scattering detector. J. Chromatography A, 864:1:179-182 referred to on page 4 of the specification and U.S. Patent No. 6,068,997 referred to in footnote 5 to Table 2. One skilled in the art would recognize the “lecithins that have been enzymatically enriched” language as referring to lysolecithins, which are described in detail in the specification, and the meaning of which is further clarified by reference to this article and the cited patent. Finally, the specification refers to Lysoprin and Bolec MT, both of which are commercially available products, and, as such, a purchaser could easily determine the content of these products.

As described above, the addition of this language was an attempt to respond to the Examiner’s erroneous rejection of the term “lysolecithin.” Even if the Board determines that there is not support in the specification for the new recitation, Appellant submits that the term “lysolecithin” is clearly supported by the specification. As such, Appellant would be willing to replace the new recitation with “lysolecithin” so that the claims were as they appeared before the last amendment.

A description of lysolecithin as used in the specification may be made by reference to the Sas article cited above and referred to on page 4 of the specification and U.S. Patent No. 6,068,997 referred to in footnote 5 to Table 2. In summary, lysolecithin refers to a product of the enzymatic conversion of lecithin to enrich it in the amounts of lysophospholipids. One of

ordinary skill in the art would know the meaning of the term “lysolecithin.” In addition, both Lysoprin and Bolec MT are commercially available products containing lysolecithins and, thus, one could easily obtain these products and determine their make-up by following, for example, the teachings of the Sas article.

The Examiner bases her rejection on the four corners of the application (Aug. 6 2004 Office Action, page 2). However, the teachings of the specification include:

1. Lysolecithins are used to improve the activity of enzymes (see page 1, lines 6-7).
2. Two sources of commercially available lysolecithins are described, Lysoprin and Bolec MT (paragraph bridging page 4 and 5).
3. The term “lysolecithin” means lecithin which has been enzymatically treated to enrich it in the amount of lysophospholipids (Sas article cited at page 4).
4. Lysoprin and Bolec MT are recited to contain lecithin which had been enzymatically treated to be enriched to 33% lysophospholipids (paragraph bridging page 4 and 5).
5. The sources of lysolecithin used in the examples contained either 16% Lysoprin or 16% Bolec MT. Simple math reveals that using 16% by weight of a product enriched in lysophospholipids to 33% makes clear that the specification teaches using at least 5% by weight of lysophospholipids ( $16\% \times 33\% = 5\%$ ) to improve the degradation of neutral detergent fiber in animal feed.

Clearly the term “lysolecithin” or “lecithins that have been enzymatically enriched in the amounts of lysophospholipids to contain at least 5% by weight of lysophospholipids to the amount of lysophospholipids plus phospholipids” are taught to those of ordinary skill in the art within the “four corners” of the patent specification. A specific embodiment of the invention can

be established by a search of the four corners of a specification, if not in a specific example which is complete in itself. Ex parte Butler, 116 U.S.P.Q. 523, 533 (P.O. Bd. App. 1957). See also In re Borkowski and Van Venrooy, 164 U.S.P.Q. 642, 645 (C.C.P.A. 1970).

## 2. Prior Art Rejections

The Examiner has withdrawn the prior art rejections in view of the amendments, but indicated that these rejections will be reinstated as appropriate upon removal of the new matter introduced by the amendment. As a result of the Examiner's indication that she will reinstate these rejections after the new matter rejection has been dealt with, Appellant will address the prior art rejections in this appeal.

Claims 1-7 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bedford *et al.* taken with Garnett *et al.* and Baisted. Claim 1 now recites that the claimed method is directed to an improvement in the degradation of neutral detergent fiber by exogenous enzymes added to an animal feed when a surfactant selected from the group consisting of lecithins that have been enzymatically enriched in the amounts of lysophospholipids has also been added. The claim also recites that the lecithins have been enriched in the amounts of lysophospholipids to a level where the lysophospholipids are present in at least 5% by weight compared to the total of lysophospholipids plus phospholipids. Claims 2-7 are dependent on claim 1. Claims 10-13 were added by the last amendment and all include the above language (claims 10-13 depend on claims with this language, and independent claim 13 includes this language).

This claimed method is neither anticipated nor made obvious by the cited references, either singly or in combination.<sup>1</sup> Bedford *et al.* teaches the use of a multi-enzyme product in cereal-based poultry and swine feeds to improve the feed conversion ratio; no lecithins

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<sup>1</sup> The claimed method is also neither anticipated nor made obvious by the cited references if the term "lysolecithins" is used in place of the current claim language. As described previously, lysolecithins are lecithins enzymatically enriched in lysophospholipids.

enzymatically enriched in lysophospholipids are used and there is no suggestion that the presence of lecithin enhances the activity of the enzymes on neutral detergent fiber, merely that feed conversion is improved. Garnett *et al.* teaches the use of lysolecithin to increase the uptake of nutrients from an animal feed and describes lysolecithin as a growth promoter but teaches nothing whatsoever about the effect of lysolecithin on the degradation of neutral detergent fiber by exogenous enzymes. Both of these references, accordingly, are directed to the effect of a feed additive as an animal growth promoter and direct stimulator of animal performance. Neither reference teaches anything whatsoever about the surprising result of the present invention in improving the degradation of neutral detergent fiber as recited in the amended claims of the present invention; indeed, there is absolutely no mention whatsoever in either reference to neutral detergent fiber.

Lysophospholipids are present in all types of biological tissues. The Baisted article discloses the mobilization of starch in cereal grains, a phenomenon that is mainly followed by a decrease in starch-bound lysophospholipid content of the endosperm tissue of the cereal grains. The article teaches nothing whatsoever about increasing the effectiveness of an enzyme on degradation of neutral detergent fiber in an animal feed.

Accordingly, none of the cited references contains any disclosure whatsoever with respect to neutral detergent fiber, much less improving the activity of enzymes in degrading neutral detergent fiber present in animal feeds. A claim reciting the improvement in degradation by an exogenous enzyme of neutral detergent fiber in animal feeds by the addition of lysolecithin is both novel and non-obvious over the cited prior art.

Appellant respectfully requests that the Board grant the claims as provided in the Appendix, or, in the alternative, grant the claims with the word "lysolecithin" replacing the



recitation "lecithins that have been enzymatically enriched in the amounts of lysophospholipids to contain at least 5% by weight of lysophospholipids to the amount of lysophospholipids plus phospholipids" which is the form of claim 1 prior to the earlier erroneous rejection of claim 1 by the Examiner.

Respectfully submitted,

Date: January 10, 2005



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## Appendix

Pending claims:

1. A method for improving the degradation by an exogenous enzyme of the neutral detergent fiber in an animal feed, comprising the step of adding to an animal feed containing the exogenous enzyme a surfactant selected from the group consisting of lecithins that have been enzymatically enriched in the amounts of lysophospholipids to contain at least 5% by weight of lysophospholipids to the amount of lysophospholipids plus phospholipids.
2. A method as defined in claim 1, wherein said exogenous enzyme has enzyme activity selected from the group consisting of  $\alpha$ -amylase,  $\alpha$ -galactosidase,  $\beta$ -glucanase, cellulase, lipase, protease and xylanase activities.
3. A method as defined in claim 1, wherein said animal feed includes from between about 10 weight percent to about 55 weight percent of a small cereal grain.
4. A method as defined in claim 3, wherein said small cereal grain is selected from the group consisting of wheat and barley.
5. A method as defined in claim 4, wherein said enzyme is added to said animal feed in an amount to provide exogenous xylanase activity of between about 100 and about 50,000 units per kilogram of said animal feed.
6. A method as defined in claim 5, wherein said surfactant is included in an amount that is between about 0.025 and about 0.200 grams/kilogram of the animal feed.
7. A method as defined in claim 1, wherein said surfactant is included in an amount that comprises between about 0.025 and about 0.200 grams/kilogram of the animal feed.
8. (Withdrawn)

9. (Withdrawn)

10. A method as defined in claim 1, wherein the degradation of neutral detergent fiber is increased by at least at least about 50% over neutral detergent fiber degradation by the exogenous enzyme alone.

11. A method as defined in claim 1, wherein the exogenous enzyme is selected from the group consisting of  $\alpha$ -amylase,  $\alpha$ -galactosidase,  $\beta$ -glucanase, cellulase, lipase and xylanase activities and further improving the degradation of neutral detergent fiber by the addition of an exogenous protease.

12. A method as defined in claim 11, wherein the protease is added in an amount between about 0.1% and about 1% by weight of the exogenous enzyme and surfactant.

13. A method of reducing the amount of exogenous enzyme required to achieve a preselected level of degradation of neutral detergent fiber in an animal feed, comprising the step of adding to the animal feed an exogenous enzyme selected from the group consisting of  $\alpha$ -amylase,  $\alpha$ -galactosidase,  $\beta$ -glucanase, cellulase, lipase and xylanase; a protease; and a surfactant selected from the group consisting of lecithins that have been enzymatically enriched in the amounts of lysophospholipids to contain at least 5% by weight of lysophospholipids to the amount of lysophospholipids and phospholipids, and wherein the amount of the exogenous enzyme added is reduced by up to about 50% without a reduction in degradation of neutral detergent fiber.